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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
SALVITTI, MICHAEL A				
ART UNIT		PAPER NUMBER		
4131				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/566,248

Applicant(s)

GAO ET AL.

Examiner

MICHAEL SALVITTI

Art Unit

4131

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/86)
Paper No(s)/Mail Date 4/27/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: A Free-Radical Polymerization Process Producing Aqueous Polymer Dispersion with Low Residual Monomer Content Utilizing Oil and Water-Soluble Initiators.

2. Applicant is reminded of the proper content of an Abstract of the Disclosure.

In chemical patent abstracts for compounds or compositions, the general nature of the compound or composition should be given as well as its use, e.g., "The compounds are of the class of alkyl benzene sulfonyl ureas, useful as oral anti-diabetics." Exemplification of a species could be illustrative of members of the class. For processes, the type reaction, reagents and process conditions should be stated, generally illustrated by a single example unless variations are necessary.

Pertinent information which should be included in the abstract includes the intentional omission of a reducing reagent from the process, the fact that this is a one-stage process, and the final product containing a low concentration of monomer.

Complete revision of the content of the abstract is required on a separate sheet.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

3. Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.

(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.

(f) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(g) BRIEF SUMMARY OF THE INVENTION.

(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(i) DETAILED DESCRIPTION OF THE INVENTION.

(j) CLAIM OR CLAIMS (commencing on a separate sheet).

(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

4. The disclosure is objected to because of the following informalities: several occurrences of numbers larger than one thousand without commas (see paragraph [0017], line 6 and paragraph [0043], line 4 for examples). Line 10 of paragraph [0020] states that polymerization was "frequently carried out to only to a monomer conversion of $\geq 95\%$ by weight". This seems contradictory, and the sign should be reversed. Polymerizations in the art comprising less than 95% monomer conversion should be denoted as " $\leq 95\%$ " rather than greater than 95%, since this is part of the novelty of the claimed invention.

5. The use of the trademark TRIGONOX® has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 parenthetically refers to trademarked compounds associated with each of the named compounds. The parenthetical phrases render the claim indefinite because it is unclear whether the generic compound is encompassed by the claim, or the claim covers only the use of the trademarked chemical.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 6-8, 10 rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 3,951,925 to *Mishima, et al.*

As to claims 1-4, 6, 8, 10 *Mishima* discloses a process for producing an aqueous polymer emulsion via an analogous procedure.

Claim 1 of the instant application is anticipated by U.S. Patent No. 3,951,925 (*Mishima* claim 2) which discloses an aqueous emulsion polymerization of ethylenically unsaturated monomers (vinyl chloride 80% by weight and another ethylenically unsaturated monomer 20% by weight). *Mishima* discusses polyvinylalcohol and methyl cellulose among other compounds as dispersants (column 2, lines 63-68 and column 3, lines 1-15). This mixture is first polymerized with an oil-soluble radical initiator, followed by heating the solution (*Mishima* claim 2). After this procedure, a stock solution containing additional monomer and a water-soluble free-radical initiator is added (*Mishima* claim 2). The water-soluble initiators used in 3,951,925 are known to have a solubility of $\geq 1\%$ by weight, and the oil-soluble free radical initiators show a solubility of $\leq 1\%$ by weight in demineralized water. For example, ammonium persulfate, a water-soluble initiator claimed by *Mishima* (column 2, line 57) shows 80% water solubility by weight, and an oil-soluble initiator claimed (column 2, line 42), Azobisisobutyronitrile (AIBN), has $< 1\%$ by weight solubility in water (see attached MSDS sheets for ammonium persulfate and AIBN). The specification of 3,951,925 (Example 1, column 5) anticipates the solids content range of 20-70% in claim 1 of the instant application (20kg monomer, 40kg water were used and polymerized to 88% completion. This suggests 44% solids by weight).

Claim 2 of the instant application is anticipated by *Mishima*. A water-soluble free radical initiator is disclosed as the second stage initiator following the oil first stage oil-soluble initiation reaction for the expressed purpose of initiating a polymerization (see *Mishima* claim 2).

Claim 3 of the instant application is anticipated by *Mishima*. Several oil-soluble initiators are stable for longer than 10 hours at room temperature while having a half-life less than 5 hours

at elevated temperature. For example, AIBN is an initiator used by 3,951,925 (column 2, line 42). This initiator has a half-life longer than 10 hours at ambient temperatures, yet a half-life of 1 hour at (see pages 35-36 of "Handbook of Reagents for Organic Synthesis: Activating Agents and Protecting Groups" by Pearson and Roush, John Wiley and Sons, 1999).

Claim 4 of the instant application is anticipated by *Mishima*. U.S. Patent No. 3,951,925 discloses a process whereby the final temperature of the reaction is at least 10°C greater than the starting temperature. Example 1 in *Mishima* (column 5, lines 1-68) describes elevating the temperature from ambient temperature to 52°C, which is approximately 30°C above ambient temperatures.

Claim 6 of the instant application is anticipated by *Mishima*. U.S. Patent No. 3,951,925 discloses the use of oil-soluble initiators in the range of 0.003% to 0.5%, which overlap the claimed lower range of the instant claims which specify 0.01-5% (see *Mishima* claim 6).

Claim 7 of the instant application is anticipated by *Mishima*, U.S. Patent No. 3,951,925. *Mishima* discloses the application of pressure to the reaction. While the patent does not distinctly state that the pressure is sufficient to prevent boiling, the pressures chosen for the reaction inherently prevent the reaction from boiling at the designated temperatures. For instance, *Mishima* (Example 2, column 6, lines 8-52) discloses a pressure of 5 kg/cm² (4.83 atm) at 57°C, which should not allow an aqueous solution to boil.

Claim 8 of the instant application is anticipated by *Mishima*. *Mishima* (see claim 5) anticipates the use of di-alkali or ammonium salts of peroxodisulfuric acid, stating that potassium persulfate or ammonium persulfate may serve as a water-soluble free-radical initiator.

Claim 10 of the instant application is anticipated by *Mishima*, U.S. Patent No. 3,951,925. Example 12 (column 12, lines 1-21) explicitly states that the reaction was continued for 13 hours following the addition of the water-soluble ammonium persulfate initiator and monomer.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 5 and 9 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,951,925 to *Mishima* as applied to U.S. Patent No. 4,739,008 to *Robinson*.

As to claims 5 and 9, *Mishima* teaches a method of polymerization of vinyl chlorides utilizing oil-soluble and water-soluble free-radical initiators in separate stages.

Mishima limits heating temperatures from 30°C-70°C, and does not disclose the use of a tert-butyl peroxide as an oil soluble radical initiator.

Robinson discloses a polymerization utilizing both an oil-soluble and a water-soluble free-radical initiator making use of a tert-butyl peroxide (see Example VIII, column 11, lines 25-35) with a temperature range of -20°C to 200°C over the course of the reaction (see claim 10).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to polymerize at higher or lower temperatures than those recited in *Mishima* because *Robinson* suggests that acrylamide can be polymerized at higher and lower temperatures (see *Robinson* claim 10). Likewise, the use of a new or commercialized initiator does not constitute an entirely new process. TRIGONOX ® as mentioned in Claim 9 is a commercially available t-butyl peroxide initiator similar to that used *Robinson* (column 11, line 29).

12. Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,951,925 to *Mishima* as applied to U.S. Patent No. 3,920,624 to *Humkey*.

As to claim 11, *Mishima* teaches a method of polymerization of vinyl chlorides utilizing oil-soluble and water-soluble free-radical initiators in separate stages.

Mishima does not expressly disclose a method of stripping the reaction mixture with inert gas and/or steam.

Humkey discloses a novel, continuous process for stripping residual volatiles from polymer pellets by the use of steam.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to use a steam or gas method of stripping the polymer as a motivation for removing excess volatile components and lowering the residual monomer content, thereby resulting in a less crude final product. Steam and gas stripping have since become standard procedures for polymer preparations.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- U.S. Patent Pub. 2003/0153710 A1 to Shin et al. discloses a method for preparing a weatherable thermoplastic resin based on oil/water soluble initiators.
- U.S. Patent No. 4,243,562 to Petit discloses a polymerization of vinyl chloride in aqueous suspension utilizing oil and water soluble initiators.
- U.S. Patent No. 5,869,577 to Aihara et al. discloses a fluorine containing copolymer with water soluble and oil soluble initiators.
- U.S. Patent No. 4,085,267 to Morningstar et al. discloses a dual-initiator system for vinyl chloride polymerization with low polymer buildup.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL SALVITTI whose telephone number is (571)270-7341. The examiner can normally be reached on Monday to Friday 8AM to 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571)272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner
Art Unit 4131